Name: Date:

Exam: Function Reflections (Solution version 604)

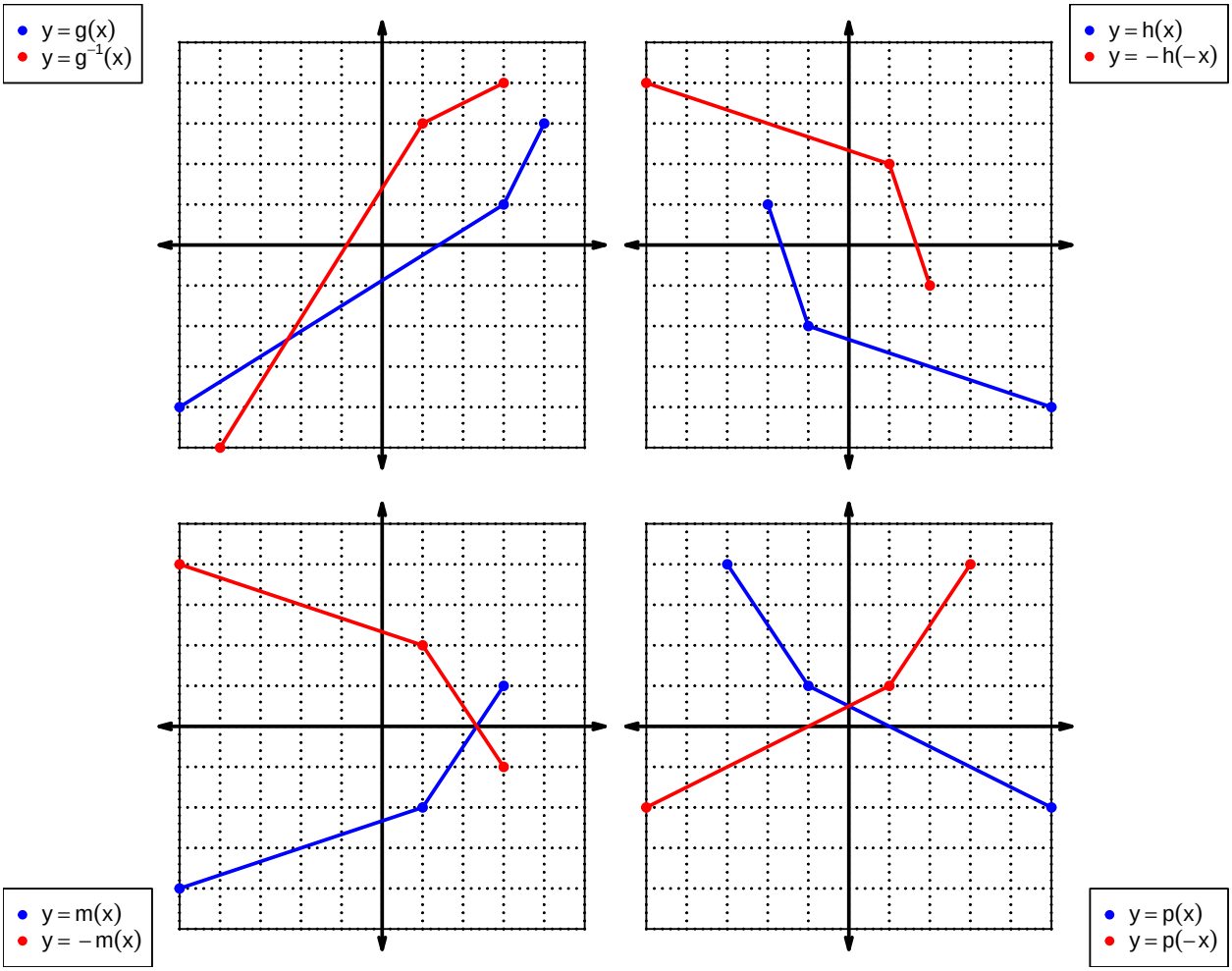
1. (worth 9 points) Let function f be defined by the polynomial below:

$$f(x) = -3x^5 - 7x^4 + 9x^3 + 6x^2 - 8x + 5$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$f(-x)$	$3x^5 - 7x^4 - 9x^3 + 6x^2 + 8x + 5$
$-f(x)$	$3x^5 + 7x^4 - 9x^3 - 6x^2 + 8x - 5$
$-f(-x)$	$-3x^5 + 7x^4 + 9x^3 - 6x^2 - 8x - 5$

2. (worth 20 points) In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



Exam: Function Reflections (Solution version 604)

For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	5	2	4
2	6	4	8
3	2	1	3
4	7	3	9
5	4	5	7
6	3	9	2
7	9	7	6
8	8	6	1
9	1	8	5

3. (worth 3 points) Evaluate $g(1)$.

$$g(1) = 2$$

4. (worth 3 points) Evaluate $h^{-1}(9)$.

$$h^{-1}(9) = 4$$

5. (worth 3 points) Assuming g is an **odd** function, evaluate $g(-6)$.

If function g is odd, then

$$g(-6) = -9$$

6. (worth 3 points) Assuming f is an **even** function, evaluate $f(-3)$.

If function f is even, then

$$f(-3) = 2$$

Exam: Function Reflections (Solution version 604)

7. (worth 15 points) A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
Let polynomial p be defined with the following equation:

$$p(x) \;=\; x^2 - x$$

a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) \;=\; (-x)^2 - (-x)$$
$$p(-x) \;=\; x^2 + x$$

b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) \;=\; -\left(x^2 + x\right)$$
$$-p(-x) \;=\; -x^2 - x$$

c. Is polynomial p even, odd, or neither?

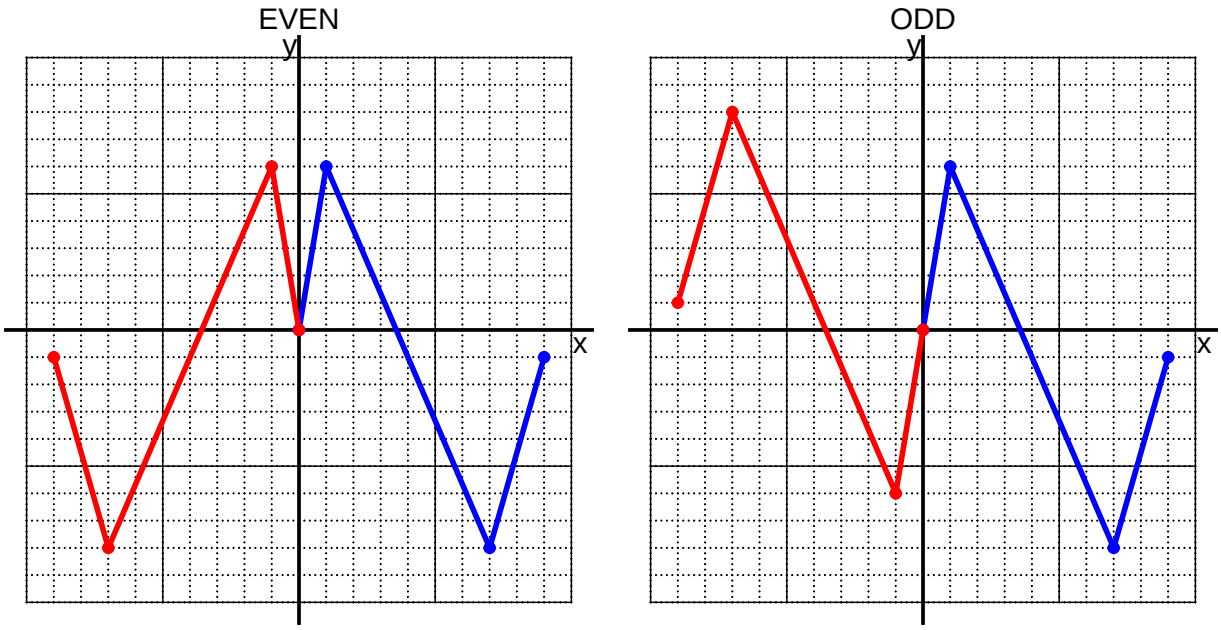
neither

d. Explain how you know the answer to part c.

We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

Exam: Function Reflections (Solution version 604)

8. (worth 10 points) I have drawn half of a function. Draw the other half to make it even or odd.



9. (worth 10 points) Let function f be defined with the equation below.

$$f(x) = \frac{x+8}{9}$$

a. Evaluate $f(91)$.

step 1: add 8
step 2: divide by 9

$$f(91) = \frac{(91)+8}{9}$$
$$f(91) = 11$$

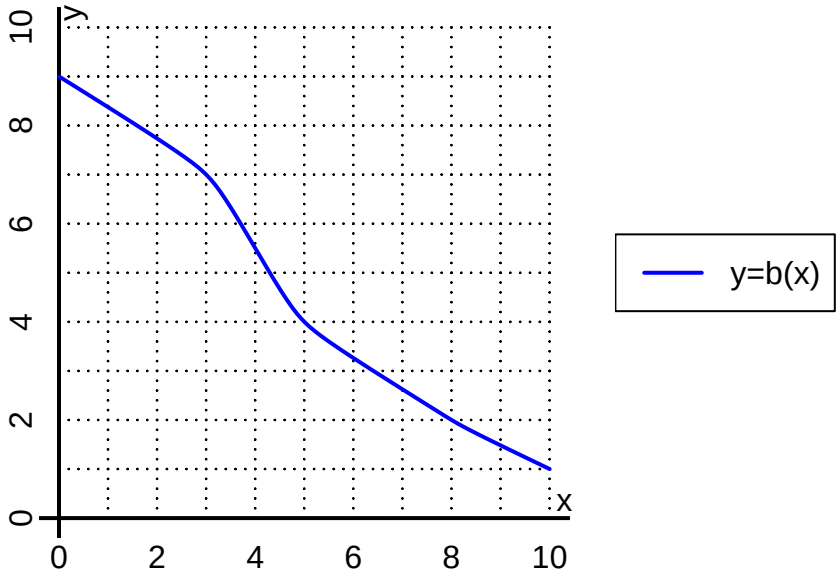
b. Evaluate $f^{-1}(2)$.

step 1: multiply by 9
step 2: subtract 8

$$f^{-1}(x) = 9x - 8$$
$$f^{-1}(2) = 9(2) - 8$$
$$f^{-1}(2) = 10$$

Exam: Function Reflections (Solution version 604)

10. (worth 6 points) The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(8)$.

$b(8) = 2$

b. Evaluate $b^{-1}(7)$.

$b^{-1}(7) = 3$

Exam: Function Reflections (Solution version 604)

11. (worth 18 points) Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-9	9	9	-9
-1	5	-5	-5	5
0	0	0	0	0
1	-5	5	5	-5
2	9	-9	-9	9

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.